

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

FOR INTERNAL USE
DO NOT PRINT

Appendix

A

Location factor (for zip code 433xx)

ECHOS

1

NA

Get-a-Quote

1.04

Overhead and profit

25%

Inflation

Total

10.86%

Inflation from 2010 to 2016 (<http://www.bls.gov/data>)

Average annual

2.08%

Prepared by:

Chit Christian

4/30/2015

Reviewed by:

Last updated:

Danielle Gibson

Updated by:

12/6/2016

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/inflation_calculator.htm)

TABLE A-1						
COST SUMMARY						
Alternative	Option	Description	Capital Cost	Institutional Controls	Operation & Maintenance	Total
1E-05 RISK						
2A	NA	Building Demolition with Off-site Disposal (25% Hazardous)	\$ 15,246,000	\$ 55,000	\$ 2,598,000	\$ 17,899,000
2B	NA	Building Demolition with Off-site Disposal (75% Hazardous)	\$ 16,864,000	\$ 55,000	\$ 2,598,000	\$ 19,517,000
3	NA	Building Demolition with On-site Containment (25-75% Hazardous)	\$ 11,799,000	\$ 55,000	\$ 2,363,000	\$ 14,217,000

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ALTERNATIVE 2A
 BUILDING DEMOLITION WITH OFF-SITE DISPOSAL (25% HAZARDOUS)

Table A-2				
Alternative 2A - Building Demolition with Off-site Disposal (25% Hazardous)				
Source	Description	Subtotal		Contingency
Table A-3	Design and Construction	\$ 11,728,074		\$ 3,518,422.25
Table A-4	Institutional Controls	\$ 42,500		\$ 12,750
Table A-5	Operation and Maintenance	\$ 1,998,484		\$ 599,545.07
Contingency		30%		\$ 4,130,717.31
Total				

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Capital Cost

Location factor (for zip code 433xx)

ECHOS	1
Get-a-Quote	1.04

Note: Location factor applied only to national average unit costs; not applied to local unit costs such as from vendors or Means.

Overhead and Profit (O&P)

General	25%	Typical general contractor overhead and profit
Means	-	NA
RACER	25%	NA
Contractor quote	5%	Prime contractor markup
Professional judgment	-	Not marked-up

Inflation 2.08% Avg. annual inflation from 2010 to 2015

Table A-3

Alternative 2A - Building Demolition with Off-site Disposal (25% Hazardous)

Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
Construction Subtotal					
Site Preparation					
1	Temporary facilities	1.0	ls	\$ 15,000.00	\$ 15,000.00
Asbestos Survey					
2	Asbestos survey	1.0	ls	\$ 6,962.00	\$ 8,702.50
Equipment Decontamination					
3	Decontamination facilities (1,500 square feet)	1.0	ls	\$ 55,716.00	\$ 69,645.00
4	Transportation and disposal (2,750 gallons of wastewater)	1.0	ls	\$ 9,632.00	\$ 12,040.00
Asbestos Removal and Disposal					
5	Asbestos removal - Office Building	1.0	ls	\$ 69,387.00	\$ 86,733.75
6	Asbestos removal - Production Building	1.0	ls	\$ 136,063.00	\$ 170,078.75
7	Asbestos removal - Building 1	1.0	ls	\$ 34,839.00	\$ 43,548.75
8	Asbestos removal - Building 2	1.0	ls	\$ 167,459.00	\$ 209,323.75
9	Asbestos removal - Building 3	1.0	ls	\$ 75,220.00	\$ 94,025.00
PCB Removal and Disposal					
10	PCB removal - Building 2	1.0	ls	\$ 65,419.00	\$ 81,773.75
11	PCB removal - Building 3	1.0	ls	\$ 106,830.00	\$ 133,537.50
12	PCB disposal	424.0	tons	\$ 265.00	\$ 272.58

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	Metal Decontamination and Disposal				
13	Decontamination facilities (1,500 square feet)	1.0	ls	\$ 67,550.00	\$ 84,437.50
14	Load and haul (non-hazardous metal)	6,082.0	ton	\$ 21.30	\$ 21.46
15	Dump charges (non-hazardous metal)	6,082.0	ton	\$ 38.00	\$ 38.29
16	Transportation and disposal (2,750 gallons of wastewater)	1.0	ls	\$ 9,632.00	\$ 12,040.00
	Building Demolition				
17	Building demolition - Office Building	1.0	ls	\$ 61,100.67	\$ 76,375.84
18	Building demolition - Production Building	1.0	ls	\$ 403,633.44	\$ 504,541.80
19	Building demolition - Building 1	1.0	ls	\$ 11,591.29	\$ 14,489.11
20	Building demolition - Building 2	1.0	ls	\$ 109,998.95	\$ 137,498.69
21	Building demolition - Building 3	1.0	ls	\$ 41,110.33	\$ 51,387.91
22	Building demolition - Walkway	1.0	ls	\$ 1,112.76	\$ 1,390.95
	Slab Demolition				
23	Slab demolition - Office Building	1.0	ls	\$ 21,191.33	\$ 26,489.16
24	Slab demolition - Production Building	1.0	ls	\$ 193,269.32	\$ 241,586.65
25	Slab demolition - Building 1	1.0	ls	\$ 4,731.12	\$ 5,913.90
26	Slab demolition - Building 2	1.0	ls	\$ 44,892.89	\$ 56,116.11
27	Slab demolition - Building 3	1.0	ls	\$ 24,135.57	\$ 30,169.46
28	Slab demolition - Maintenance Building	1.0	ls	\$ 14,481.73	\$ 18,102.16
29	Slab demolition - Buildings 4 and 5	1.0	ls	\$ 120,679.81	\$ 150,849.76

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Table A-3					
Alternative 2A - Building Demolition with Off-site Disposal (25% Hazardous)					
Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
	Waste Characterization				
30	Sampling and analysis for pesticides, PCBs, and VOCs (building debris and wastewater)	1.0	ls	\$ 70,913.00	\$ 88,641.25
	Transportation and Disposal				
31	Dump charges (non-hazardous waste)	39,896.0	ton	\$ 38.00	\$ 38.29
32	Load and haul (non-hazardous waste)	39,896.0	ton	\$ 21.30	\$ 21.46
33	Transportation and disposal (hazardous)	2,734.0	ton	\$ 265.00	\$ 272.58
	Capping				
34	Asphalt pavement - 6 inch base course layer, 3 inch topping	40,463.0	sy	\$ 37.28	\$ 46.60
35	Cap material sampling and analysis (every 500 ft)	2.0	ea	\$ 2,000.00	\$ 2,000.00
36	Cap thickness verification (every 100 ft)	10.0	ea	\$ 150.00	\$ 150.00
	Crushing				
37	Bulldozer (crushing non-hazardous debris for fill)	160.0	hour	\$ 213.92	\$ 267.40
38	Backhoe, 0.75 CY (crushing non-hazardous debris for fill)	160.0	hour	\$ 114.04	\$ 142.55
39	Jackhammer (crushing of non-hazardous debris for fill)	160.0	hour	\$ 188.10	\$ 235.13
	Measurement				
40	Pre-construction surveying	14.0	days	\$ 1,620.00	\$ 2,194.52
41	Post-construction surveying	14.0	days	\$ 1,620.00	\$ 2,194.52
Construction subtotal					
Construction Contractor Mobe/Demobe, Site Prep and Submittals		10%			
Pre-design investigation		10%			
Engineering design		18%			
Project management and construction oversight		7%			
Capital Cost Subtotal					

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Table A-4					
Institutional Controls					
Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
Institutional Controls Subtotal					
42	Prepare LUC Implementation Plan (mid-level staff with senior review)	250	hr	\$ 110.00	\$ 110.00
43	Meetings with agencies (senior staff and attorneys)	60	hr	\$ 250.00	\$ 250.00

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Operation and Maintenance

Table A-5					
Operation and Maintenance					
Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
Annual Operation and Maintenance Subtotal					
Cap Monitoring					
44	Engineer site visit (1 per year)	1.0	ls	\$ 3,500.00	\$ 3,500.00
45	Proj. Mgmt. 2 hrs/wk on proj for 24 weeks	48.0	hr	\$ 125.00	\$ 125.00
Cap Repair					
46	Seal coat	352,000.0	sf	\$ 0.17	\$ 0.17
47	Crack sealing	10,000.0	lf	\$ 0.85	\$ 0.86

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	Total (Rounded)
	\$ 15,246,000
	\$ 55,000
	\$ 2,598,000

\$ 17,899,000

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\$ 459,898
\$ 84,438
\$ 130,537
\$ 232,883
\$ 12,040
\$ 785,685
\$ 76,376
\$ 504,542
\$ 14,489
\$ 137,499
\$ 51,388
\$ 1,391
\$ 529,227
\$ 26,489
\$ 241,587
\$ 5,914
\$ 56,116
\$ 30,169
\$ 18,102
\$ 150,850

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Total Cost	
	\$ 88,641
	\$ 88,641
	\$ 3,129,157
	\$ 1,527,640
	\$ 856,282
	\$ 745,235
	\$ 1,891,076
	\$ 1,885,576
	\$ 4,000
	\$ 1,500
	\$ 103,212
	\$ 42,784
	\$ 22,808
	\$ 37,620
	\$ 61,446
	\$ 30,723
	\$ 30,723
	\$ 8,088,327
	\$ 808,832.70
	\$ 808,832.70
	\$ 1,455,898.86
	\$ 566,182.89
	\$ 11,728,074

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	Total Cost
	\$ 42,500
	\$ 27,500
	\$ 15,000

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Total Cost	
\$ 78,363	
\$ 9,500	
\$ 3,500	
\$ 6,000	
\$ 68,863	
\$ 60,298	
\$ 8,565	

ALTERNATIVE 2B
BUILDING DEMOLITION WITH OFF-SITE DISPOSAL (75% HAZARDOUS)

#REF!

Table A-6	
Alternative 2A - Building Demolition with Off-site Disposal (75% Hazardous)	
Source	Description
Table A-7	Design and Construction
Table A-8	Institutional Controls
Table A-9	Operation and Maintenance
Contingency	30%
Total	

Capital Cost

Location factor (for zip code 433xx)

ECHOS	1
Get-a-Quote	1.04

Note: Location factor applied only to national average unit costs; not applied to local unit costs such as f

Overhead and Profit (O&P)

General	25%	Typical general contractor overhead and profit
Means	-NA	
RACER	25%	NA
Contractor quote	5%	Prime contractor markup
Professional judgment	-	Not marked-up

Inflation 2.08% Avg. annual inflation from 2010 to 2015

#REF!

Table A-7	
Alternative 2A - Building Demolition with Off-site Disposal (75% Hazardous)	
Item	Description
	Construction Subtotal
	Site Preparation
1	Temporary facilities

	Asbestos Survey
2	Asbestos survey
	Equipment Decontamination
3	Decontamination facilities (1,500 square feet)
4	Transportation and disposal (2,750 gallons of wastewater)
	Asbestos Removal and Disposal
5	Asbestos removal - Office Building
6	Asbestos removal - Production Building
7	Asbestos removal - Building 1
8	Asbestos removal - Building 2
9	Asbestos removal - Building 3
	PCB Removal and Disposal
10	PCB removal - Building 2
11	PCB removal - Building 3
12	PCB disposal
	Metal Decontamination and Disposal
13	Decontamination facilities (1,500 square feet)
14	Load and haul (non-hazardous metal)
15	Dump charges (non-hazardous metal)
16	Transportation and disposal (2,750 gallons of wastewater)
	Building Demolition
17	Building demolition - Office Building
18	Building demolition - Production Building
19	Building demolition - Building 1
20	Building demolition - Building 2
21	Building demolition - Building 3
22	Building demolition - Walkway
	Slab Demolition
23	Slab demolition - Office Building
24	Slab demolition - Production Building
25	Slab demolition - Building 1
26	Slab demolition - Building 2
27	Slab demolition - Building 3
28	Slab demolition - Maintenance Building
29	Slab demolition - Buildings 4 and 5

Table A-7

Alternative 2A - Building Demolition with Off-site Disposal (75% Hazardous)

Item	Description
	Waste Characterization
30	Sampling and analysis for pesticides, PCBs, and VOCs (building debris and wastewater)
	Transportation and Disposal
31	Dump charges (non-hazardous waste)
32	Load and haul (non-hazardous waste)
33	Transportation and disposal (hazardous)

	Capping
34	Asphalt pavement - 6 inch base course layer, 3 inch topping
35	Cap material sampling and analysis (every 500 ft)
36	Cap thickness verification (every 100 ft)
	Crushing
37	Bulldozer (crushing non-hazardous debris for fill)
38	Backhoe, 0.75 CY (crushing non-hazardous debris for fill)
39	Jackhammer (crushing of non-hazardous debris for fill)
	Measurement
40	Pre-construction surveying
41	Post-construction surveying

Construction subtotal

Construction Contractor Move/Demove, Site Prep and Submittals

Pre-design investigation

Engineering design

Project management and construction oversight

Capital Cost Subtotal

#REF!

Table A-8	
Institutional Controls	
Item	Description
	Institutional Controls Subtotal
42	Prepare LUC Implementation Plan (mid-level staff with senior review)
43	Meetings with agencies (senior staff and attorneys)

Operation and Maintenance

#REF!

Table A-9	
Operation and Maintenance	
Item	Description
	Annual Operation and Maintenance Subtotal
	Cap Monitoring
44	Engineer site visit (1 per year)
45	Proj. Mgmt. 2 hrs/wk on proj for 24
	Cap Repair
46	Seal coat
47	Crack sealing

Hide

ALTERNATIVE 2B

DEMOLITION WITH OFF-SITE DISPOSAL (75% HAZARDOUS)

Table A-6

A - Building Demolition with Off-site Disposal (75% Hazardous)

	Subtotal		Contingency	Total (Rounded)
	\$ 12,972,345		\$ 3,891,703.58	\$ 16,864,000
	\$ 42,500		\$ 12,750	\$ 55,000
	\$ 1,998,484		\$ 599,545.07	\$ 2,598,000
			\$ 4,503,998.64	
				\$ 19,517,000

Capital Cost

from vendors or Means.

Table A-7

Alternative 2A - Building Demolition with Off-site Disposal (75% Hazardous)

	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)	Total Cost
					\$ 8,946,445
					\$ 15,000
	1.0	ls	\$ 15,000.00	\$ 15,000.00	\$ 15,000

					\$ 8,703
	1.0	ls	\$ 6,962.00	\$ 8,702.50	\$ 8,703
					\$ 81,685
	1.0	ls	\$ 55,716.00	\$ 69,645.00	\$ 69,645
	1.0	ls	\$ 9,632.00	\$ 12,040.00	\$ 12,040
					\$ 603,711
	1.0	ls	\$ 69,387.00	\$ 86,733.75	\$ 86,734
	1.0	ls	\$ 136,063.00	\$ 170,078.75	\$ 170,079
	1.0	ls	\$ 34,839.00	\$ 43,548.75	\$ 43,549
	1.0	ls	\$ 167,459.00	\$ 209,323.75	\$ 209,324
	1.0	ls	\$ 75,220.00	\$ 94,025.00	\$ 94,025
					\$ 330,886
	1.0	ls	\$ 65,419.00	\$ 81,773.75	\$ 81,774
	1.0	ls	\$ 106,830.00	\$ 133,537.50	\$ 133,538
	424.0	tons	\$ 265.00	\$ 272.58	\$ 115,574
					\$ 459,898
	1.0	ls	\$ 67,550.00	\$ 84,437.50	\$ 84,438
	6,082.0	ton	\$ 21.30	\$ 21.46	\$ 130,537
	6,082.0	ton	\$ 38.00	\$ 38.29	\$ 232,883
	1.0	ls	\$ 9,632.00	\$ 12,040.00	\$ 12,040
					\$ 785,685
	1.0	ls	\$ 61,100.67	\$ 76,375.84	\$ 76,376
	1.0	ls	\$ 403,633.44	\$ 504,541.80	\$ 504,542
	1.0	ls	\$ 11,591.29	\$ 14,489.11	\$ 14,489
	1.0	ls	\$ 109,998.95	\$ 137,498.69	\$ 137,499
	1.0	ls	\$ 41,110.33	\$ 51,387.91	\$ 51,388
	1.0	ls	\$ 1,112.76	\$ 1,390.95	\$ 1,391
					\$ 529,227
	1.0	ls	\$ 21,191.33	\$ 26,489.16	\$ 26,489
	1.0	ls	\$ 193,269.32	\$ 241,586.65	\$ 241,587
	1.0	ls	\$ 4,731.12	\$ 5,913.90	\$ 5,914
	1.0	ls	\$ 44,892.89	\$ 56,116.11	\$ 56,116
	1.0	ls	\$ 24,135.57	\$ 30,169.46	\$ 30,169
	1.0	ls	\$ 14,481.73	\$ 18,102.16	\$ 18,102
	1.0	ls	\$ 120,679.81	\$ 150,849.76	\$ 150,850

Table A-7

Alternative 2A - Building Demolition with Off-site Disposal (75% Hazardous)

	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)	Total Cost
					\$ 88,641
	1.0	ls	\$ 70,913.00	\$ 88,641.25	\$ 88,641
					\$ 3,987,275
	35,864.0	ton	\$ 38.00	\$ 38.29	\$ 1,373,252
	35,864.0	ton	\$ 21.30	\$ 21.46	\$ 769,744
	6,766.0	ton	\$ 265.00	\$ 272.58	\$ 1,844,279

					\$ 1,891,076
	40,463.0	sy	\$ 37.28	\$ 46.60	\$ 1,885,576
	2.0	ea	\$ 2,000.00	\$ 2,000.00	\$ 4,000
	10.0	ea	\$ 150.00	\$ 150.00	\$ 1,500
					\$ 103,212
	160.0	hour	\$ 213.92	\$ 267.40	\$ 42,784
	160.0	hour	\$ 114.04	\$ 142.55	\$ 22,808
	160.0	hour	\$ 188.10	\$ 235.13	\$ 37,620
					\$ 61,446
	14.0	days	\$ 1,620.00	\$ 2,194.52	\$ 30,723
	14.0	days	\$ 1,620.00	\$ 2,194.52	\$ 30,723
					\$ 8,946,445
	10%				\$ 894,644.50
	10%				\$ 894,644.50
	18%				\$ 1,610,360.10
	7%				\$ 626,251.15
					\$ 12,972,345

Table A-8					
Institutional Controls					
	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)	Total Cost
					\$ 42,500
	250	hr	\$ 110.00	\$ 110.00	\$ 27,500
	60	hr	\$ 250.00	\$ 250.00	\$ 15,000

Operation and Maintenance

Table A-9					
Operation and Maintenance					
	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)	Total Cost
					\$ 78,363
					\$ 9,500
	1.0	ls	\$ 3,500.00	\$ 3,500.00	\$ 3,500
weeks	48.0	hr	\$ 125.00	\$ 125.00	\$ 6,000
					\$ 68,863
	352,000.0	sf	\$ 0.17	\$ 0.17	\$ 60,298
	10,000.0	lf	\$ 0.85	\$ 0.86	\$ 8,565

Internal Comments

Professional judgement 2016

RACER	2015
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Professional judgment	2015
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Professional judgment	2015
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RACER	2015
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RACER	2015
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RACER	2015
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Get-a-Quote	2013	Pg. 316
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Get-a-Quote	2013	Pg. 316
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Professional judgment	2015
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Professional judgment	2015
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Professional judgment	2016
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Professional judgment	2016
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Contractor quote	2017
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Contractor quote	2017
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ALTERNATIVE 3
BUILDING DEMOLITION WITH ON-SITE CONTAINMENT (25-75% HAZARDOUS)

Table A-10				
Alternative 3 - Building Demolition with On-site Containment (25-75% Hazardous)				
Source	Description	Subtotal		Contingency
Table A-11	Design and Construction	\$ 9,076,108		\$ 2,722,832.48
Table A-12	Institutional Controls	\$ 42,500		\$ 12,750
Table A-13	Operation and Maintenance	\$ 1,817,356		\$ 545,206.83
Contingency		30%		\$ 3,280,789.31
Total				

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Capital Cost

Location factor (for zip code 433xx)

ECHOS	1
Get-a-Quote	1.04

Note: Location factor applied only to national average unit costs; not applied to local unit costs such as from vendors or Means.

Overhead and Profit (O&P)

General	25%	Typical general contractor overhead and profit
Means	-NA	
RACER	25%	NA
Contractor quote	5%	Prime contractor markup
Professional judgment	-	Not marked-up

Inflation 2.08% Avg. annual inflation from 2010 to 2015

Table A-11

Alternative 3 - Building Demolition with On-site Containment (25-75% Hazardous)

Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
Construction Subtotal					
Site Preparation					
1	Temporary facilities	1.0	ls	\$ 15,000.00	\$ 15,000.00
Asbestos Survey					
2	Asbestos survey	1.0	ls	\$ 6,962.00	\$ 8,702.50
Equipment Decontamination					
3	Decontamination facilities (1,500 square feet)	1.0	ls	\$ 55,716.00	\$ 69,645.00
4	Transportation and disposal (2,750 gallons of wastewater)	1.0	ls	\$ 9,632.00	\$ 12,040.00
Asbestos Removal and Disposal					
5	Asbestos removal - Office Building	1.0	ls	\$ 69,387.00	\$ 86,733.75
6	Asbestos removal - Production Building	1.0	ls	\$ 136,063.00	\$ 170,078.75
7	Asbestos removal - Building 1	1.0	ls	\$ 34,839.00	\$ 43,548.75
8	Asbestos removal - Building 2	1.0	ls	\$ 167,459.00	\$ 209,323.75
9	Asbestos removal - Building 3	1.0	ls	\$ 75,220.00	\$ 94,025.00
PCB Removal and Disposal					
10	PCB removal - Building 2	1.0	ls	\$ 65,419.00	\$ 81,773.75
11	PCB removal - Building 3	1.0	ls	\$ 106,830.00	\$ 133,537.50

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12	PCB disposal	424.0	tons	\$ 265.00	\$ 272.58
Metal Decontamination and Disposal					
13	Decontamination facilities (1,500 square feet)	1.0	ls	\$ 67,550.00	\$ 84,437.50
14	Load and haul (non-hazardous metal)	5,369.0	ton	\$ 21.30	\$ 21.46
15	Dump charges (non-hazardous metal)	5,369.0	ton	\$ 38.00	\$ 38.29
16	Transportation and disposal (2,750 gallons of wastewater)	1.0	ls	\$ 9,632.00	\$ 12,040.00
Building Demolition					
17	Building demolition - Office Building	1.0	ls	\$ 61,100.67	\$ 76,375.84
18	Building demolition - Production Building	1.0	ls	\$ 403,633.44	\$ 504,541.80
19	Building demolition - Building 1	1.0	ls	\$ 11,591.29	\$ 14,489.11
20	Building demolition - Building 2	1.0	ls	\$ 109,998.95	\$ 137,498.69
21	Building demolition - Building 3	1.0	ls	\$ 41,110.33	\$ 51,387.91
22	Building demolition - Walkway	1.0	ls	\$ 1,112.76	\$ 1,390.95
Table A-11					
Alternative 3 - Building Demolition with On-site Containment (25-75% Hazardous)					
Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
Waste Characterization					
23	Sampling and analysis for pesticides, PCBs, and VOCs (building debris and wastewater)	1.0	ls	\$ 60,279.00	\$ 75,348.75
Transportation and Disposal					
24	Dump charges (non-hazardous waste)	34,623.0	ton	\$ 38.00	\$ 38.29
25	Load and haul (non-hazardous waste)	34,623.0	ton	\$ 21.30	\$ 21.46
Asphalt Cap					
26	Asphalt pavement - 6 inch base course layer, 3 inch topping (includes 0.9-2.6 feet debris foundation layer)	11,515.0	sy	\$ 37.28	\$ 46.60
27	Cap material sampling and analysis (every 500 ft)	2.0	ea	\$ 2,000.00	\$ 2,000.00
28	Cap thickness verification (every 100 ft)	8.0	ea	\$ 150.00	\$ 150.00
Prescriptive Cap					
29	Seeding, vegetative cover	3.7	ac	\$ 3,994.78	\$ 4,993.48
30	Topsoil, 6 inches deep	3,752.0	lcy	\$ 40.80	\$ 51.00
31	Clay, low permeability, 2 feet (includes 0.6-1.7 feet debris foundation layer)	16,811.0	cy	\$ 30.27	\$ 37.84
32	60 Mil polymeric liner, high-density polyethylene	178,313.0	sf	\$ 0.74	\$ 0.93
Crushing					
33	Bulldozer (crushing debris for fill)	400.0	hour	\$ 213.92	\$ 267.40
34	Backhoe, 0.75 CY (crushing debris for fill)	400.0	hour	\$ 114.04	\$ 142.55
35	Jackhammer (crushing of debris for fill)	400.0	hour	\$ 188.10	\$ 235.13
Measurement					
36	Pre-construction surveying	14.0	days	\$ 1,620.00	\$ 2,194.52
37	Post-construction surveying	14.0	days	\$ 1,620.00	\$ 2,194.52

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa



Construction subtotal	
Construction Contractor Mobe/Demobe, Site Prep and Submittals	10%
Pre-design investigation	10%
Engineering design	18%
Project management and construction oversight	7%
Capital Cost Subtotal	

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

Table A-12					
Institutional Controls					
Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
Institutional Controls Subtotal					
38	Prepare LUC Implementation Plan (mid-level staff with senior review)	250	hr	\$ 110.00	\$ 110.00
39	Meetings with agencies (senior staff and attorneys)	60	hr	\$ 250.00	\$ 250.00

Operation and Maintenance

Table A-13					
Operation and Maintenance					
Item	Description	Quantity	Unit	Unit Price	Unit Price (Incl. O&P)
Annual Operation and Maintenance Subtotal					
Cap and Groundwater Monitoring					

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

[illegible]

\$ 14,217,000

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

Total Cost	
	\$ 6,259,385
	\$ 15,000
	\$ 15,000
	\$ 8,703
	\$ 8,703
	\$ 81,685
	\$ 69,645
	\$ 12,040
	\$ 603,711
	\$ 86,734
	\$ 170,079
	\$ 43,549
	\$ 209,324
	\$ 94,025
	\$ 330,886
	\$ 81,774
	\$ 133,538

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

\$ 115,574
\$ 417,294
\$ 84,438
\$ 115,234
\$ 205,582
\$ 12,040
\$ 785,685
\$ 76,376
\$ 504,542
\$ 14,489
\$ 137,499
\$ 51,388
\$ 1,391
Total Cost
\$ 75,349
\$ 75,349
\$ 2,068,843
\$ 1,325,734
\$ 743,109
\$ 541,799
\$ 536,599
\$ 4,000
\$ 1,200
\$ 1,010,954
\$ 18,576
\$ 191,352
\$ 636,086
\$ 164,940
\$ 258,030
\$ 106,960
\$ 57,020
\$ 94,050
\$ 61,446
\$ 30,723
\$ 30,723

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

\$ 6,259,385
\$ 625,938.50
\$ 625,938.50
\$ 1,126,689.30
\$ 438,156.95
\$ 9,076,108

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

Total Cost	\$ 42,500
	\$ 27,500
	\$ 15,000

Total Cost
\$ 70,821
\$ 11,140

Appendix A
Building Demolition
Des Moines TCE Site
Des Moines, Iowa

Table A-14						
Present Value Analysis						
Year	Annual Discount Factor ²	Alternative 2A - Building Demolition with Off-site Disposal (25% Hazardous)				
		1E-5 Risk				
		Operation and Maintenance Costs				
		Description	Future Cost ³	Description	Future Cost ³	Present Value (2015)
0	1.000					\$0
1	0.985	Cap O&M	\$78,363			\$77,205
2	0.971	Cap O&M	\$78,363			\$76,064
3	0.956	Cap O&M	\$78,363			\$74,940
4	0.942	Cap O&M	\$78,363			\$73,832
5	0.928	Cap O&M	\$78,363	Five-Year Review	\$25,000	\$95,948
6	0.915	Cap O&M	\$78,363			\$71,666
7	0.901	Cap O&M	\$78,363			\$70,607
8	0.888	Cap O&M	\$78,363			\$69,564
9	0.875	Cap O&M	\$78,363			\$68,536
10	0.862	Cap O&M	\$78,363	Five-Year Review	\$25,000	\$89,065
11	0.849	Cap O&M	\$78,363			\$66,525
12	0.836	Cap O&M	\$78,363			\$65,542
13	0.824	Cap O&M	\$78,363			\$64,573
14	0.812	Cap O&M	\$78,363			\$63,619
15	0.800	Cap O&M	\$78,363	Five-Year Review	\$25,000	\$82,675
16	0.788	Cap O&M	\$78,363			\$61,752
17	0.776	Cap O&M	\$78,363			\$60,840
18	0.765	Cap O&M	\$78,363			\$59,941
19	0.754	Cap O&M	\$78,363			\$59,055
20	0.742	Cap O&M	\$78,363	Five-Year Review	\$25,000	\$76,744
21	0.731	Cap O&M	\$78,363			\$57,322
22	0.721	Cap O&M	\$78,363			\$56,475
23	0.710	Cap O&M	\$78,363			\$55,641
24	0.700	Cap O&M	\$78,363			\$54,818
25	0.689	Cap O&M	\$78,363	Five-Year Review	\$25,000	\$71,238
26	0.679	Cap O&M	\$78,363			\$53,210
27	0.669	Cap O&M	\$78,363			\$52,424
28	0.659	Cap O&M	\$78,363			\$51,649
29	0.649	Cap O&M	\$78,363			\$50,886
30	0.640	Cap O&M	\$78,363	Five-Year Review	\$25,000	\$66,128
Total Present Value of Periodic Cost						\$1,998,484

Notes:

1 From OMB Circular A-94 Appendix C, Updated November 2015

2 Annual discount factor = $1/(1+i)^t$, where i = discount rate (includes inflation and interest) and t = year

3 Current dollar cost of future event

O&M Operations and maintenance